



Morphology-based phylogenetic analysis of the treehopper tribe Smiliini (Hemiptera: Membracidae: Smiliinae), with reinstatement of the tribe Telamonini

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Abstract

Members of the Smiliini, the nominotypical tribe of the large New World subfamily Smiliinae, are predominately Nearctic in distribution. This tribe included 169 mostly tree-feeding species in 23 genera. A parsimony-based phylogenetic analysis of an original dataset comprising 89 traditional and newly discovered morphological characters for 69 species, including representatives of 22 of the 23 described genera of Smiliini and five other previously recognized tribes of the subfamily, resulted in a single most parsimonious tree with three major clades. The broad recent concept of Smiliini (including Telamonini as a junior synonym) was not recovered as monophyletic by the analysis. Instead, the analysis supported narrower definitions of both Telamonini, here **reinstated** from synonymy, and Smiliini. A key and diagnoses are given to define these tribes, along with discussions of their phylogeny, biogeography, and host plant associations. The genera *Antianthe* Fowler, *Hemicardiacus* Plummer, *Smilirhexia* McKamey, and *Tropidarnis* Fowler are placed as Smiliinae, *incertae sedis*. Based on the phylogeny, several genera from both tribes including *Atymna* Stål, *Cyrtolobus* Goding, *Heliria* Stål, and *Telamona* Fitch are not monophyletic.

Diagnostic characters emphasizing the morphological differences between the Smiliini and Telamonini include the dorsal margin of the head, the shape of the pronotum, the size of the pronotal humeral angles, the presence or absence of pronotal longitudinal rugae, the size of forewing cells, variations in the fusion of veins R and M apically in both the fore- and hind wing, and the shape of the apex of the female second valvulae.

Mapping geographic distribution onto the phylogeny suggests that the common ancestor of the ingroup (all three clades) occurred in Central America and Mexico, with multiple dispersals to temperate North America. Many Smiliini and Telamonini feed on various species of oak (*Quercus*) and the close evolutionary association between these insects and their hosts is discussed.

Key words: Homoptera, oak, geographic distribution, biogeography, host plants